

Topic: Intro to Microscopes Lab

Summary: Students will learn how to use a microscope with proper techniques.

Goals & Objectives: Students will be able to focus the microscope. Students will be able to make a wet mount slide. Students will be able to use the microscope properly.

Standards: CA Biology *Investigation & Experimentation a.* Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.

Time Length: 60 minutes

Prerequisite Knowledge: Safety rules

Materials:

- Water
- Yarn
- Hair
- Scissors
- Newspaper
- Pipette
- Beaker
- Cover slips
- Blank microscope slides
- Microscope slides with an embedded ruler
- Microscope cleaning cloth
- Compound microscope

Lab Setup:

Place microscopes either on students' desks if you have electrical access or on the lab tables around the room with electrical access. Plug in the microscopes. Place a blank microscope slide, a slide with an embedded-ruler, a pipette, and beaker with water on each student's desk. Have scissors next to a table with newspaper and yarn for students to cut a letter e and a small piece of yarn.

Procedures:

1. Group students as lab partners. The groups are assigned to a microscope.

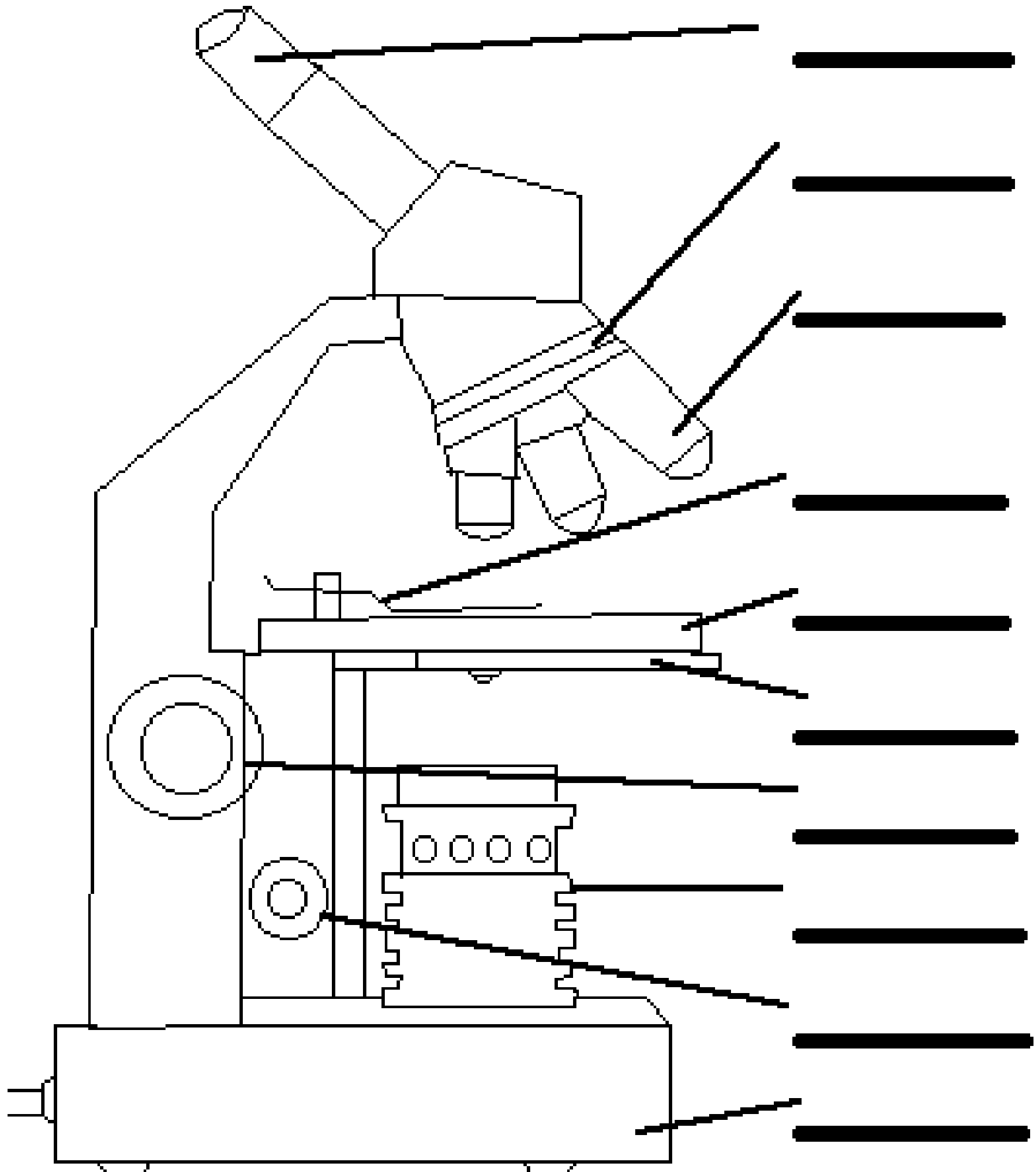
2. Explain to the class the parts of the microscope. Students are filling in the parts on their handout. Demonstrate to the class how to do a wet mount. Demonstrate to the class how to focus and use the microscope.
3. Students cut a small e from the newspaper. Students make a wet mount with the e facing them as if they were going to read it. Then students place the slide onto the stage and focus using low power. Students then draw in the circle (step #7 in their handout). Students answer questions in steps 8-9.
4. Students then make a wet mount of a small piece of yarn on the ruler-embedded slide. Students use the low power of their objective. Students then draw the yarn with the ruler in the corresponding circle (step #10 in their handout). Students answer the question in step 11.
5. Students make a wet mount of their hair. One student can share a piece of their hair. No student is allowed to pull or cut another student's hair. Students draw the hair in the circle in step 12 and answer question 13.
6. Students answer the analysis and conclusion questions.

Accommodations: Students with an IEP can take the handout home if they need extra time or perform one of the labs instead of all three.

Evaluation:

Each drawing is worth 5 points, for a total of 15 points. Questions 8-13 in the experiment section are worth 3 points each, for a total of 12 points. Each question in the analysis section is worth 3 points, for a total of 15 points. The conclusion is worth 3 points. This assignment is worth a total of 45 points.

Microscope Lab



Problem Statement:

In this lab, you will learn to properly use the microscope. To accomplish this, you will learn the different parts of a microscope. You learn how to operate a microscope so that you will not damage the microscope or your slide. You will also learn how prepare a wet slide mount.

Hypothesis:

If I use the microscope correctly, then I can focus and observe tiny things.

Materials:

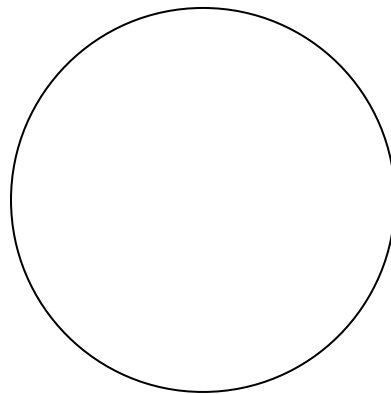
- Water
- Yarn
- Hair
- Scissors
- Pipette
- Beaker
- Cover slips
- Newspaper
- Blank microscope slides
- Microscope slides with an embedded ruler
- Microscope cleaning cloth
- Compound microscope

Procedures:

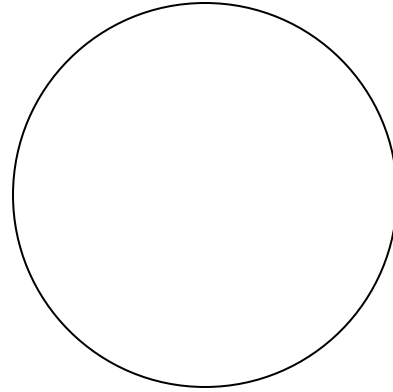
1. You and your lab partner are assigned to a particular microscope. You may only use this microscope. Do not touch another student's microscope without teacher permission.
2. Clean the microscope objectives and eyepiece using the special microscope cloth.
3. Cut an "e" out of the newspaper. Make sure to cut around the "e" and not have any other letters showing. Using the pipette, place a drop of water in the center of the slide. Place the e in the center of the blank slide. Place the cover slip on top of the water. It is important to place cover slip on the edge of the water at a 45-degree angle. Then lower the cover slip slowly to prevent air bubbles. If you get any air bubbles, you need to tap the cover slip and use a paper towel to remove the excess water.
4. Make sure the microscope is on the lowest objective. Lower the microscope stage so it is farthest away from the objective. *Place the slide onto the stage under the stage clips with the letter "e" facing you as if you would normally read it.*
5. Make sure the microscope is on the lowest objective. Turn on the microscope and move the slide so your letter "e" is centered with light shining through it. Move the course adjustment so that the stage is as far up as it will go.
6. Now look through the eyepiece and move the course adjustment to focus your letter. You will probably need to move the slide to center it.

Experiment:

7. Draw in the circle to the right the letter e that you see in the microscope.
8. Move the slide slightly to the right. Draw an arrow in the circle to show the direction you saw the slide move.
9. Move the slide slightly forward and draw an arrow showing its direction.



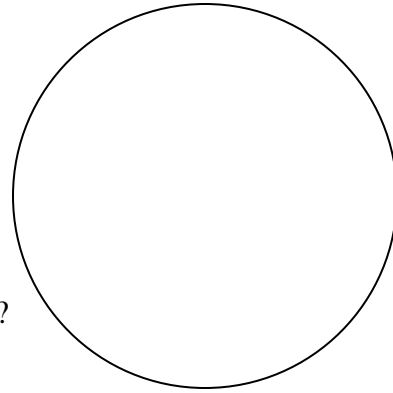
10. Now make a wet mount of a piece of yarn, using the microscope slide with an embedded ruler. Draw what you see in the circle to the right.



11. Draw the ruler in the circle next to the yarn. What magnification are you using to look at the yarn?

$$\frac{\text{Eyepiece}}{\text{Objective}} * \frac{\text{Objective}}{\text{Total}} = \frac{\text{Total}}{\text{Total}}$$

12. Now make a wet mount of a piece of hair, using the microscope slide with an embedded ruler. Focus first using the low objective. Now switch to the medium objective and focus. Draw what you see in the circle to the right.



13. When you switched objectives, the field of view changed. How does the field of view affect what you see?

Analysis:

1. What kind of problems will the air bubbles on a slide cause? _____

2. Why do you always focus away from the objective, especially on high power? _____

3. If you were tracking a bacteria and the organism moved from the bottom of the view to the top of the view, what direction would you move the slide to continue watching the bacteria.

4. Dirt or smudge marks on a slide will lower your? _____

5. If you were going to add a stain to your already prepared wet mount, how could you do this?

Conclusion: Compare how the hair looked in the microscope versus using just your eyes.
